

Cornstalk

A Publication of the Nebraska Corn Board

www.nebraskacorn.org

A matter of perspective



Some critics say corn and ethanol consume too much water.

Compared to what?

As part of their continuing efforts to convince Nebraskans that increased corn and ethanol production is detrimental to the state, critics are focusing more and more on the emotional issue of water.

More specifically, the criticism revolves around the amount of water used to produce corn and ethanol. For example, a recent headline in one of the state's major newspapers blared "Do the math: Corn costs 1,750 gallons of water a bushel". Anti-ethanol groups regularly point out that it takes three gallons of water to produce one gallon of ethanol.

As part of its "Powering Nebraska's Economy with Corn" campaign launched in the fall, the Nebraska Corn Board has been trying to bring some badly needed perspective to the agricultural water usage issue.

"Yes, agriculture and ethanol use water — we don't deny that," said Don Hutchens, executive director of the Nebraska Corn Board. "What most of the critics fail to tell you, however, is that every person and every industry in Nebraska — be it for manufacturing, recreation, municipalities or agriculture — uses water in some form."

For example, an 18 hole golf course uses more than 680,000 gallons of water per acre per year and an average homeowner uses 21,600 gallons for the lawn. "Just to produce 80,000 copies of a Sunday newspaper a whopping 12 million gallons is used," Hutchens said. "That doesn't mean those water uses are bad or unnecessary but, like agriculture, they are just one part of the whole picture."

Hutchens said the Nebraska Corn Board is also trying to clarify a couple of other major misconceptions.

"One of the big ones is that increased corn and ethanol production are causing big declines in our groundwater table. While it's true that groundwater levels declined in some areas of the state, the main culprit is the major drought we have been experiencing since 1999," he said.

"With improved precipitation in eastern Nebraska in this past year, groundwater levels have already started to increase in some areas that had experienced declines."

Another positive message is that the corn and ethanol industries are continuously working to improve water efficiency. "Through technology, corn producers have significantly reduced the use of irrigation water — and we're still producing big crops," Hutchens said. "Newer technology reduces irrigation needs even further and improves the timing of irrigation, making

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FIELDnotes

by Jon Holzfaster, Chairman

Mother Nature provides some of the water I need to raise corn. Corn producers further east receive more rain and irrigate less — and many don't irrigate at all. Yet many people have been programmed through poorly construed headlines to believe that corn producers are sucking the state dry.

You and I know that's crazy, but our city cousins seem to forget that everyone and every industry uses water. The problem is, many pivots are visible from the road. When someone sees a pivot running and then hears a story about how Lake McCaughy is low, they assume one plus one equals 10 and miss the eight other things that contribute to the situation — like the seven-year drought!

Do they realize that the city of Lincoln uses 38 million gallons of water every day or that the city of Omaha uses nearly 100 million gallons per day? The entire ethanol industry in Nebraska — producing some 1.1 billion gallons of renewable ethanol per year that has so many benefits for this state — uses only about nine million gallons per day, and most of that is treated and returned to the environment.

If you sit down for a drink, you can let your city neighbors know that it takes 1,500 gallons of water to make a barrel of beer. If you see them at a gas station, mention that it takes about 93 gallons of water to produce one gallon of gas. Or that, on average, every person in the country uses between 100 and 150 gallons of water each and every day.

Over a cup of coffee, casually mention that 74 gallons of water was poured into their coffee cup — and that their Sunday newspaper soaked up another 150 gallons. That's right, it took about 23 million gallons for 100,000 people to have a cup of coffee and buy a single Sunday paper.

The real point we need to make, though, is all industries use water — and that the corn and ethanol industries are no different than the newspaper, coffee or any other industry.

Corn producers can raise yields while reducing water use

On his farm near Davenport, Mark Jagels knows first hand what the latest research and tools can do when trying to raise a bumper corn crop using as little irrigation water as possible.

"When I look back to 10 years ago, a lot has changed," said Jagels, District 2 director for the Nebraska Corn Board. "We've gone from using 20 inches of water per acre to less than 10 inches, and this year we probably used 25-30 percent less than that, yet yields have only gone up."

Jagels noted that he and a lot of other corn producers have gone from gravity irrigation to center pivots, then from high pressure to medium or low pressure pivots. Some producers use drop lines to irrigate down in the crop's canopy. Each step increases the efficiency of water use, which allows corn producers to reduce their water use and production costs.

"Diesel, natural gas and propane are all expensive," Jagels said. "The less we use them, the better."

Another option is to convert to electrical pumps, which can be set to run during off peak hours — overnight and mornings - reducing energy costs. "That's the best time to irrigate anyway," he said, "It saves water and reduces costs."

Ken Cassman, a systems agronomist with the University of Nebraska-Lincoln, and a team of researchers across the state have worked on innovative new approaches to irrigate more efficiently. The Nebraska Corn Board has sponsored some of this research, and continues to fund research into better irrigation techniques and technologies. It also sponsors irrigation field days for producers so they can learn the best management practices and conserve water.

"We're developing a tool that helps producers better match water availability to the corn crop's needs in situations where the amount of irrigation water is reduced," Cassman said. Research projects have included drip irrigation and in-ground "drip" irrigation lines that provide water at root-level during key growing times, and a computer-based decision-support tool for improved irrigation timing.

These and other projects also take into account evapotranspiration, which can be monitored with gauges. Evapotranspiration equals the amount of water from plant transpiration, or how much water "evaporates" from the plant's leaves, plus the amount of water that evaporates from the soil. Suat Irmak, an irrigation science specialist in the Biological Systems Engineering Department at UNL, is leading a statewide effort to monitor evapotranspiration and soil water status at multiple depths to help with irrigation management.

"We've used evapotranspiration gauges the last two years," Jagels said. "They help us know when to irrigate, especially when combined with soil meters. Less evapotranspiration means we can put off irrigating. It also helps us decide the best time to begin irrigating after a rain — so we don't start too soon or don't wait too long."

As more research is done, including research with in-ground irrigation lines, that knowledge base will expand.

"To raise a good crop with limited water requires good management and the ability to apply the water you do have at the right time," Cassman said. "That's what we're starting to figure out, and the results so far indicate exciting potential to reduce irrigation use even further, while still achieving high yields."



Technologies reduce water, energy footprint of ethanol plants

A variety of numbers get tossed around when it comes to ethanol plants and water, and lately a lot of the news has focused on how much water an ethanol plant uses

without a good explanation of how that water is used. There has also been very little talk about the trend of water use and what the future may hold. In fact, the ethanol plant of the future may not require any outside "process" water at all.

Process water is water used within the plant as part of the conversion of corn to ethanol. It is different from "utility" water, which is used for cooling, steam generation and transferring heat from one area to another. "The difference between the two is important because about two-thirds of the water that comes into an ethanol plant is utility water, and

utility water is treated and returned to the environment," said Mark Shmorhun, vice president of business development for Delta-T, a company that designs ethanol plants. "The remaining one-third is process water, and some of that ends up in the distillers grains. Some plants treat and discharge the remaining process water, while others are designed to not generate any process wastewater at all."

Shmorhun said most ethanol plants today use 3-6 gallons of water to produce 1 gallon of ethanol — but two-thirds of that is utility water. "A decade ago, plants were using 7-10 gallons of water to produce ethanol and a decade from now they'll be using a lot less than today," he said. "Plants today also use about one-third the energy they did a decade ago."

The dramatic reduction in water and energy use has occurred thanks to investments in research and technology, which wouldn't happen if the industry wasn't successful.

"All companies that design, build and operate ethanol plants are continuously improving efficiency," said Randy Klein, director of market development with the Nebraska Corn Board. "An important thing to remember is that most of the water used by an ethanol plant is recycled and used again outside the plant. In some cases it's used for irrigation and in other cases it's released back into a stream or other body of water." It is also consumed by cattle in the form of wet distillers grains.

Pacific Ethanol in Madera, Cal., has built a plant that generates no process or utility wastewater at

all, while several companies have built plants that use municipal gray water — water from a waste treatment system that normally goes to a river system — as their utility water. "I am not aware of a plant that has utilized gray water on the process side because we don't know if it will affect the distillers grains," Shmorhun said. "You can bet someone will figure out a way to do it."

Dryer technologies also exist that use superheated steam to dry distillers grains. "Drying distillers grains is essentially evaporating water," Shmorhun said. "Regular dryers lose all that moisture into the air, but new designs let us take all that exhaust and use it as an energy source elsewhere in the plant. It decreases water consumption and captures energy, cutting 30 percent of the energy needed to make ethanol."

All in all, Klein said, ethanol developers are all about innovation and reducing water and energy consumption and there is no reason to expect that to change. "It's pretty exciting what we're seeing today," he said.

It's also just the beginning. "In the future, we will be able to take the moisture in corn and meet all of the process water requirements for an ethanol plant," Shmorhun said. "We'll also be able to run an ethanol plant without using any electricity from the grid. It's just a matter of continuing to invest in the technology and know-how."

NRDs keep eye on water use

When issues of water use come up, it is important to remember that there are people keeping a close eye on the situation and using regulatory authority when necessary to curb water use or approve new uses for the state's groundwater.

"Nebraska's Department of Natural Resources and Natural Resources Districts monitor water use in each river basin throughout the state, so for people to say farmers and ethanol plants go out and use all the water they want when they want isn't quite right," said Kelly Brunkhorst, ag promotion coordinator for the Nebraska Corn Board.

One of the main roles of NRDs, which were formed in the early 1970s, is to manage groundwater for quality and quantity, said Dean Edson, executive director of the Nebraska Association of Resources Districts. "NRDs declare immediate moratoriums on the expansion of irrigated acres and well drilling when a river basin is fully or over appropriated by the Nebraska Department of Natural Resources," he said.

DNR determines when a basin is fully or over appropriated. "Once a moratorium is declared,

the local NRD has to develop an integrated water management plan, which may include groundwater allocations," Edson said.

Several river basins in the state have been declared fully or over appropriated, while NRDs have declared moratoriums on others where there were concerns between groundwater levels and potential surface water problems, he said.

"Because NRDs keep an eye on water use, if a company wants to build an ethanol plant, the local NRD may require the plant to offset that water use," Brunkhorst said. "For example, when the plant in Madrid was proposed, the company had to buy land and water rights that would offset the amount of water the plant would use. The result was water use did not increase once the ethanol plant was up and running."

Edson explained that each NRD has its own rules on how the offset process works. Some, he said, buy offsets and put them into a "bank" that the local NRD controls. "Those water offsets are then available for other uses," he said.

Water tables recover when rains return

It all started in 1999: Precipitation fell below normal in the Nebraska Panhandle and spread east, bringing a drought to most of the state. The drought persisted in the eastern half of the state until being broken over the past year. Western Nebraska, however, hasn't seen the recovery and is still facing drought conditions.

The wide-spread, multi-year drought resulted in reduced visible surface water and altered groundwater levels — with the water table in some parts of the state dropping. "Changes in the water table are what you'd expect during a drought and now during a recovery in parts of the state," said Dr. Mark Burbach, an environmental scientist at the University of Nebraska-Lincoln.

During a drought, groundwater doesn't have the ability to recharge itself and there is simply more demand on the water. "When it's dry, you see more demands overall for water; when it's wet, you don't," he said. "There's nothing unusual about that."

The ability for groundwater to recover from a drought varies significantly from one area to another. "In areas with sandy soil and a shallow depth of water, the groundwater can recharge quickly. If the soil is fine-textured and aquifer deeper, it can take a long time," Burbach said.

In 2007, ground water levels began to rise in parts of the state, mostly the eastern half, as demonstrated by maps developed by UNL this fall (see maps at <http://snr.unl.edu/information/GroundwaterMaps.asp>).

Above-normal precipitation, well-timed rains and more efficient irrigation practices may all be factors in the relatively good news reflected on the one-year map, Burbach said.

Although western Nebraska has not benefited in the short-term from the above-normal rains that have helped the rest of the state, Burbach said that after the 1980s and 1990s, two of the wettest decades on record, groundwater levels in eastern Nebraska were mostly back to where they were when measurements were first recorded.

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corn producers more efficient. Many producers also practice no-till and other farming techniques that reduce evaporation and water use."

New ethanol plants are also very water efficient — and existing plants continue to update their processes to become more efficient in their water usage. "When someone hears that an ethanol plant uses 350,000 gallons of water a day, I'm sure that sounds like a lot, but it needs to be put in perspective," Hutchens said. "In the end, everyone needs to use water responsibly. I think farmers and ethanol producers, through technology and management practices, are doing just that."



Other Water Users...



About 2 gallons of water are used to brush our teeth.



A 5 minute shower can take 25-50 gallons.



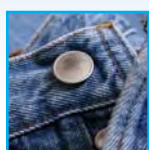
It takes 12 to 20 gallons of water to run an automatic dishwasher for one cycle.



It takes 150 gallons of water to produce an average-sized Sunday newspaper.



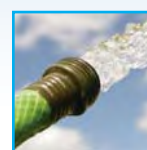
It takes about 93 gallons of water to produce one gallon of gas.



About 1,800 gallons of water are needed to produce the cotton in a pair of jeans.



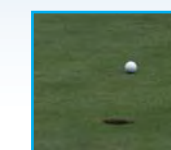
It takes 39,000 gallons of water to produce the average domestic auto, including tires.



A typical garden hose can deliver 50 gallons of water in just five minutes.



The city of Omaha uses nearly 100 million gallons of water per day.



To irrigate a golf course requires 684,000 gallons of water per acre per year.



The CORner Office

by Don Hutchens,
Executive Director

The year 2007 should go down as a pretty darn good year for nearly all of agriculture. It included record wheat prices, rising soybean prices, larger than normal demand for milk here and abroad, feeder cattle prices that rebounded for much of the year, hog prices that stayed profitable despite increased production and heavier weights, solid demand for poultry products and cattle futures that hovered around \$1.00/lb.

It was a year when Nebraska's agricultural landscape continued to evolve. We now have 21 ethanol plants, some expanded feedlots and hog operations, a couple of new dairies, railroad tankers vs. grain cars, paddle trailers delivering distillers grains, 30 E85 refueling stations, 450,000 Flex Fuel vehicles, numerous rural communities with a new lease on life — and, oh yes, an economic vitality that the entire state gets to share in.

With all of this positive news, it has been absolutely mind boggling how corn has taken it on the chin from the media. Unfortunately, many of your corn checkoff resources have had to be diverted to answer many an unfounded critique, or to finance a study that puts fact in place over myth. Also, your checkoff dollars are squarely focused on trying to make sure this new ethanol industry is here to stay and that we in Nebraska have the ability to grow our livestock operations in a way that allows them to profit and do it in a sound environmental way.

Corn farmers should not apologize to anyone for trying to bring their commodity to a new level of demand. The last time I checked it was not the responsibility of the Nebraska corn farmer to bring in a crop valued below the cost of production. Let's hope 2008 continues to be a positive year, built on a foundation of what checkoffs are supposed to do for all of our commodities — build new markets and new uses so farmers and ranchers can do what they do best.

Kernels of Truth

Campaign sets record straight on corn, ethanol

My family has been in the petroleum business for a long, long time. But today we're in the energy business — and renewable fuels are a critical component in our long-term strategy.

Ethanol is getting behind almost pretty fast everywhere. But people consistently forget why the ethanol industry was created in the first place — to give America a renewable, reliable transportation fuel source. We simply cannot continue to place our economic and national security at jeopardy by being dangerously dependent on foreign sources of energy. We're competing with China, India and other emerging nations for oil — and that will drive the price up even more.

Frankly, I don't know where we'd be without ethanol. As gasoline demand continues to skyrocket, ethanol is increasing our nation's total fuel supply and tempering prices at the pump. In fact, ethanol provides the same amount of energy for the U.S. as we currently receive from the rest of the world. Ethanol is not the only answer to America's energy challenges. But it is an answer. And it's working for us right here, right now.

70% of ethanol is used for fuel

\$1 per gallon

\$18 per bushel

\$10.73 per bushel

The Nebraska Corn Board thanks these ethanol and agriculture advocates for their contributions to this message:

- US Bioenergy Policy Policy
- US Bioenergy Policy
- Nebraska Corn Board
- Nebraska Corn Board
- Nebraska Corn Board
- Nebraska Corn Board
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NEBRASKA CORN BOARD
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A Nebraska Corn Board campaign has been emphasizing the positive side of corn and ethanol production in Nebraska, while also responding to negative messages and attacks.

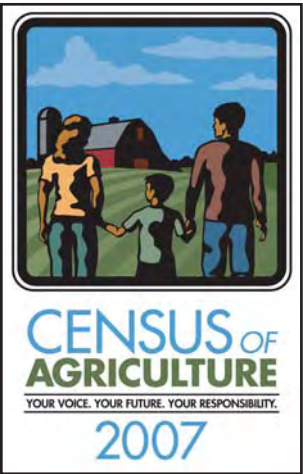
“It’s like the corn and ethanol industries have been under some kind of coordinated attack of negative messages that don’t tell the whole story,” said Don Hutchens, executive director of the Nebraska Corn Board. “Although we work continuously to set the record straight with accurate information, we decided to do some additional outreach of our own as part of these efforts — to spread the positive message of the many benefits that the corn and ethanol industries bring to Nebraska.”

The “Powering Nebraska’s Economy with Corn” campaign has been aimed at both rural and urban consumers. It has included extensive radio advertising across the entire state and advertising in the Omaha and Lincoln Sunday newspapers. Additional activities and promotions have also taken place.

Hutchens thinks the campaign has been successful in counteracting some of the myths and misconceptions about corn and ethanol production. “As one corn producer put it, ‘It’s about time someone sticks up for corn,’” Hutchens said. “We will continue to be proactive on the issues. I would much rather be on offense than constantly playing defense.”

(To see the series of newspaper ads that appeared in the Omaha and Lincoln newspapers, go to www.nebraskacorn.org and click on the Powering Ad Campaign icon.)

Census of Agriculture is underway



Census of Agriculture forms are arriving in farm mailboxes around the country, providing agricultural producers a voice in the future of their industry and community.

Taken every five years, the Census of Agriculture is a survey of America’s farms, ranches and people that operate them. It is the most complete agricultural data resource available, providing the only source of uniform, comprehensive information for every county in the nation.

“We encourage all corn producers who receive a Census report form to fill it out accurately and return it,” said Kelly Brunkhorst, ag promotion coordinator of the Nebraska Corn Board. “Not only does the Census give the farmers and ranchers of Nebraska the chance to be heard, but it gives them the valuable opportunity to influence key decisions that will shape the direction of American agriculture in general, and their community in particular, for years to come.”

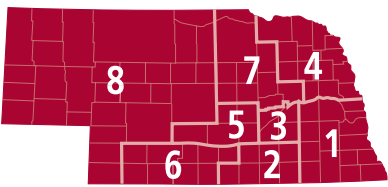
According to the USDA, responding to the census will be even easier this year as producers may fill out the form online via a secure web site.



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Nebraska Corn Board members represent the eight districts indicated on the map and are appointed by the Governor. One at-large member is elected by the other Board members.



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